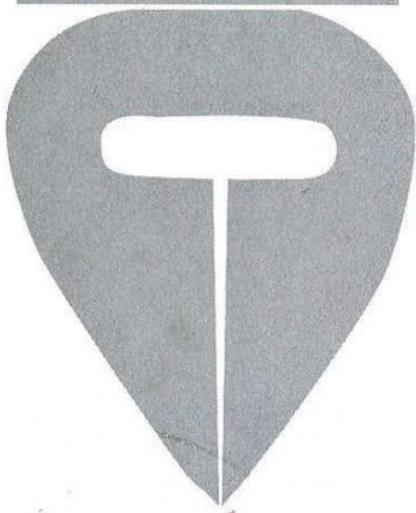


Instituto Tecnológico y de Estudios Superiores de Monterrey



1991

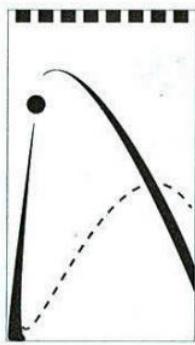
Annual Report

CENTER FOR ARTIFICIAL INTELLIGENCE

1991

A nnual Report

CENTER FOR ARTIFICIAL INTELLIGENCE



ITESM

Sucursal de Correos "J"

Monterrey, N.L.

64849 México

Tel. (83) 58•2000 Ext. 5131

Fax. (83) 58•2000 Ask Ext. 5143 or 58•1400 Dial Ext. 5143

Contents

3

INTRODUCTION FROM THE DIRECTOR

6

GOALS AND SERVICES

7

INFRASTRUCTURE

8

LINES OF RESEARCH

9

FACULTY

16

VISITING PROFESSORS

17

ASSOCIATED UNIVERSITIES

18

GRADUATE PROGRAM IN ARTIFICIAL INTELLIGENCE

19

RESEARCH

20

DEVELOPMENT

21

EXTENSION

23

RELATIONS

24

GRADUATE STUDENTS

26

PUBLICATIONS

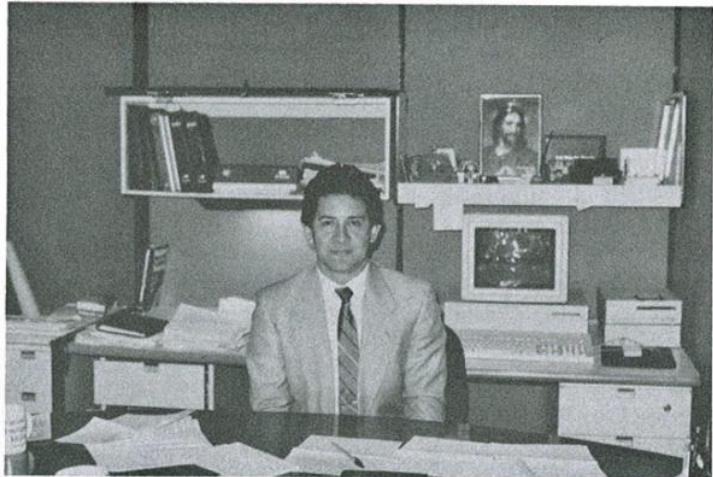
28

FINANCE

I ntroduction from the director

This report presents a summary of the activities developed at the Center for Artificial Intelligence (CAI) at ITESM Monterrey Campus during 1991. These activities are classified into teaching, research, development, extension, external relations, publication activities, and the formation of young faculty.

As a young center that has existed for barely three years, the CAI has concentrated its efforts on integrating human resources, identifying research lines relevant to meeting its goals, seeking financial sources that would allow for a self-sufficient operation, establishing the way to combine teaching, research and development responsibilities in a viable way, the forming of the required infrastructure, and indentifying strategic partners that help the Center meet its goals effectively.



The integration of human resources has been achieved by hiring faculty wishing to pursue a career in research and university teaching, and by forming young faculty with the potential to become prominent professors in their field. In 1991 three new faculty were hired for a total of eight, four faculty enrolled in PhD programs, for a total of 10, and five faculty identified schools for initiating PhD studies during 1992. By 1995, CAI faculty should number at least 25 professors specialized in AI and related fields.

Identification of research lines relevant to CAI's goals has developed over the last eight years through a process of monitoring scientific advances in the AI field, identifying niches relevant to our environment, and matching this with faculty interests. During 1991 work was consolidated in knowledge-based systems, some progress was made in establishing intelligent robotics and cognitive systems as viable research lines, and distributed AI was identified as an area with potential growth.

Obtaining funds that would allow for a self-sufficient operation has proved quite difficult. Progress was made in 1991 in continuing the mid-term research and development projects in knowledge-based systems with the corporations CYDSA and HYLSA. However, finding funds for projects with a predominant component of scientific research is not easy.

Almost all faculty were teaching two classes by the end of 1991. This goal was established in 1990. Around 30 graduate and undergraduate courses were taught in 1991. Faculty evaluation by students reached 2.1 by the end of 1991 on a scale from 1, which means excellent, to 7 which means worst; the average of the campus is 2.1 and 2 means very good. One problem is to guarantee professors at least two courses to teach a semester. A partial solution is assigning CAI's professors as adjuncts to computing and engineering departments.

By the end of 1991, 31 theses were being supervised. Of these, 6 were finished. Most of these theses are related to research projects undertaken by faculty. Publications generated from this activity are reported.

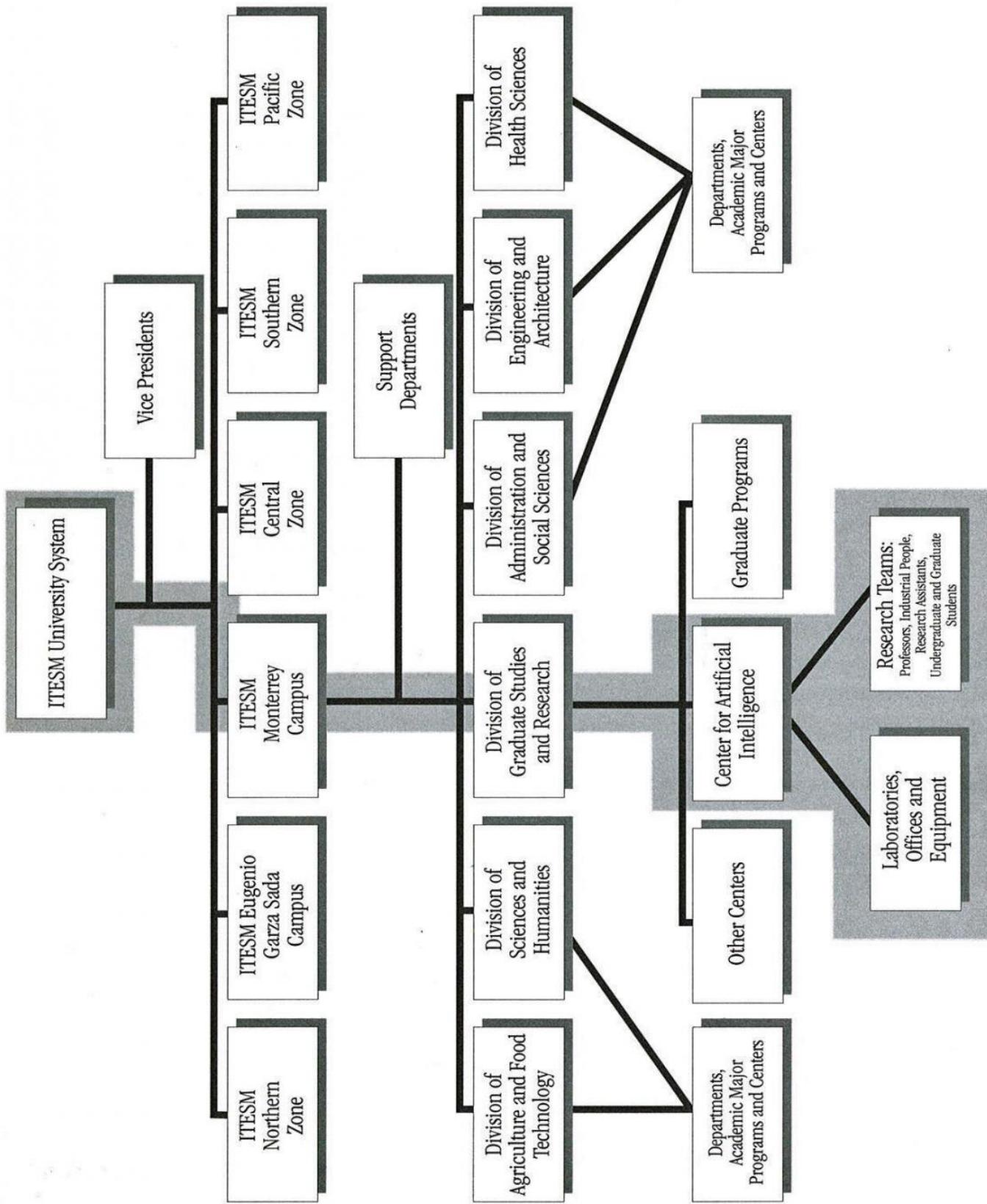
The successful combination of teaching, research and development activities is a challenge for all faculty.

Six workstations were added to the department's equipment base and fifteen PS/2 386 were put in the training room. Access to the Cray YMP2/116 was obtained through a special agreement with Texas A&M University.

Cooperation agreements in research and PhD programs are under negotiations with Carnegie Mellon University, The University of Oklahoma, Texas A&M University, Stanford University, The University of Texas at Austin, Rice University, The University of Edinburgh, UK, and the Institut National Polytechnique de Grenoble, France.

We believe that important progress was made during 1991 to accomplish the final goals established for the CAI. The future looks promising although challenging and we are optimistic about achieving our objectives.

Francisco J. Cantu
Director



Goals and services

The Center for Artificial Intelligence (CAI) was established in 1989 to consolidate the academic and industry-related work accomplished since the early 80s at the Informatics Research Center. Currently it is developing and transferring technology that solves problems relevant to the Mexican industry.

The CAI explores and develops concepts, techniques and methodologies in artificial intelligence (AI) to find solutions to academic and application problems.

Its objectives are:

- Promote and develop basic and applied research in artificial intelligence.
- Provide support to doctoral, master's and specialization programs for the development of human resources.
- Facilitate the transfer of AI technology to Mexican industry.

During 1991 the Center for Artificial Intelligence relied on the services of 13 faculty members, 3 adjunct professors, 10 faculty members pursuing doctoral degrees abroad, 7 adjunct researchers, 13 professors from associated universities, 13 research assistants who contribute to research work while studying in graduate programs and 4 part-time undergraduate students in Computer Science.

The Center for Artificial Intelligence offers the following services:

Research

- Research through master's and doctoral theses, and sponsored projects.

Technology Transfer

- Diploma in expert systems.
- Certificate in knowledge engineering.
- International symposia on artificial intelligence (ISAI).
- Lecture series in expert systems and artificial intelligence for high-level management.
- Special presentations on the use of artificial intelligence and expert systems.
- Training of knowledge engineers.

Teaching

- Teaching of undergraduate courses in computer science, information systems and engineering.
- Teaching of master's and doctoral courses in the Informatics and Engineering Graduate Programs.

Development

Joint development of knowledge-based and expert systems in manufacturing, engineering, medicine, agriculture, human resources, marketing, finance, control engineering, and robotics.

I nfraestructure

In order to accomplish the objectives described before, the CIA has the following resources:

Hardware

5 Sun SparkStations, 2 VaxStations, 1 RS/6000, 1 NextStation, 35 Apple Macintoshes and 15 IBM PS2/386.

2 Laser Writers and 12 Image Writer II's, 2 image digitizers and 3 Apple CD ROM players.

All the equipment is interconnected via Ethernet, Token Ring and Apple Talk local networks through bridges and gateways.

Software

Artificial intelligence languages:

Lisp (Sun Common Lisp, Allegro Common Lisp, Golden Common Lisp, OPS5 Macintosh, OPS5 Vax, Mac and PC Scheme),

Prolog (Mac Prolog and M Prolog), Light Speed C++, MPW C, LightSpeed Pascal, MPW Pascal with MacApp
Operating Systems Ultrix, AIX, VMS, MVS, DOS, Smalltalk, Macintosh.

Development tools Nexpert-Object, Level 5 Object, G2, CLIPS, ART-IM, Expert System Environment, M. 1. Personal Consultant Plus, PC Images, PC On Line, VP Expert, Exsys, First Class.

Training room.

Facility for training knowledge engineers, equipment with 20 IBM PS/2 70's.

University computer resources.

Access to IBM 4381, Vax 6310, MicroVax II, IBM RS/6000, IBM 9021 at ITESM Estado de Mexico Campus, Cray YMP2/116 at Texas A&M University, Cray YMP/4 at UNAM.

Campus network: Ethernet and Token Ring (Optic fiber backbone).

International networks: Bitnet, Internet, AppleLink, Thenet, CSnet, NSFnet, Arpanet.

Access to all ITESM Campuses (26) via a satellite network.

Area

The CAI Occupies approximately 12,400 square feet at the CETEC building.

The CAI maintains close working relationship with the mexican industry and supports its international competitiveness with technology and human resources trained in an environment of research and technological development.

Lines of research

Areas of research are determined on the basis of scientific and technological advances in artificial intelligence, the potential impact that these advances have on organizations, and the research interests of the center's faculty members. The following lines have been identified:

- **Knowledge Based Systems.**

Knowledge acquisition, knowledge modelling, knowledge representation, automated reasoning, KBS validation.

- **Cognitive Systems.**

Induction, analogy, explanation and case-based learning, genetic algorithms, neural networks, natural language.

- **Intelligent Robotics and Control.**

Computer vision, speech recognition, plan generation, robot programming.

- **Distributed Artificial Intelligence.**

Massive parallel computing, cellular automata, concurrent programming.

- **Intelligent Decision Support Systems.**

Expert systems and DSS, intelligent executive information systems, intelligent manufacturing.

Faculty

José Luis Aguirre Cervantes



Associate professor of Computer Science and Artificial Intelligence.

Docteur en Informatique, Institut National Polytechnique de Grenoble, France, 1989.

Research interest areas:

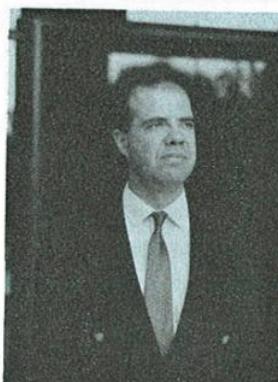
Knowledge Models. Diagnostic Problem Solving, Machine Learning, Co-operative Systems.

Coordinated projects:

Expert System for Diagnosing Quality Defects on Cellophane Film Production (Knowledge-Based Systems). Expert System for Controlling Salt Production (Knowledge-Based Systems).

Expert System for Diagnosing Defects and Quality Problems on Printing and Laminating Machines.

Ramón Brena Pinero



Assistant professor of Computer Science and Artificial Intelligence.

Docteur en Informatique, Institut National Polytechnique de Grenoble, France, 1989.

Research interest Areas:

Programming and Knowledge-Based Systems Environments, Formal Deduction Systems and Automated Reasoning. Implementation on a computer of methodologies for KBS construction. This will take the form of an environment (an integrated set of tools). Formalization of those methodologies in order to exploit their mathematical properties. The focus is on diagnosis problems.

Coordinated projects:

Expert System project on diagnosis for a polyethylene film production machine. Expert system for controlling salt production.

Olivia M. Barrón Cano



Instructor of Computer Science and Artificial Intelligence.

M.Sc., Computer Science, ITESM, 1992. Dissertation in progress.

Research interest areas:

Knowledge Acquisition, Automated Reasoning and Knowledge-Based Systems that can help in the Learning Process.

Coordinated projects:

A Tutoring System for Macintosh

equipment.

Moraima Campbell Dávila



Assistant professor of Information Systems.

M.C.A., Management Science, ITESM, 1989.

Research interest areas:

Software Engineering, Informations Systems Management, User Interface Design, Integration of Multi-media, Expert Systems and Data Bases in Applications, Desktop Publishing.

Coordinated projects:

Human interface design for MacPlan, Tecnet Service and MacChatter projects. Expert systems and multimedia. Database system for ISAI.

Francisco J. Cantú Ortiz



Director of the Center for Artificial Intelligence and Full Professor of Computer Science and Artificial Intelligence.

M.Sc., Computer Science, North Dakota State University, 1978.

Research interest areas:

Knowledge Representation, Automated Reasoning, AI Applications and Technology Transfer.

Coordinated projects:

Expert systems in manufacturing for CYDSA Corporation, AI Techniques in steel industry for HYLSA, Medical expert systems for ITESM Medical School.

José Luis Gordillo Moscoso



Associate Professor of Computer Science and Artificial Intelligence.

Docteur, Informatique, Institut National Polytechnique de Grenoble, France, 1988.

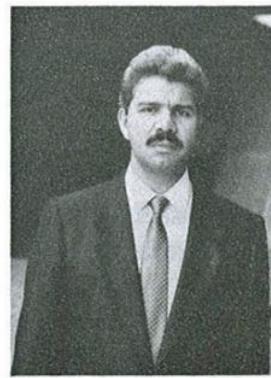
Research interest areas:

Computer vision and digital image processing, robotics and automation, computational geometry and parallel processing.

Coordinated projects:

Image processing and analysis for orthodontic diagnosis. Alcoa: Automatic color fuses recognition and assembly. Policyd: Monitoring and controling PVC process. Construction and treatment of 3D images using a laser strip sensor.

Luis Ernesto López Mellado



Associate Professor of Control Engineering and Artificial Intelligence.

Docteur-Ingénieur in Automation University of Toulouse, France, 1986.

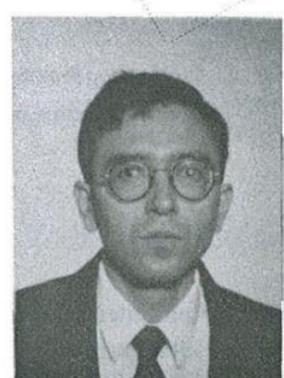
Research interest areas:

Automation of Manufacturing Systems. Task Programming and Execution Control of Robotized Cells. Petri Nets Applications in Manufacturing.

Coordinated projects:

Decision support system for operating an ingot reheating stage in a hot-rolling steel process. Model and knowledge based scheduling for discrete event systems. A task programming environment for manufacturing cells.

Arnulfo Pérez Pérez



On leave as visiting professor at the Kyushu Institute of Technology, Japan, 1989-92.

Ph.D., Electrical Engineering, University of Tennessee, 1989.

Research interest areas:

Digital image processing, parallel architectures.

Pablo Ramírez Flores



Associate Professor of Computer Science and Electrical Engineering.

M. Sc., Electrical Engineering, ITESM, 1990.

Research interest areas:

Microprocessor and Microcontroller Systems, Computer Architecture, Computer Networks and Protocols, CAD for Electronic, Computer Network Systems.

Coordinated projects:

TecNet Link, TokenTalk, Acuario, Technical support on Macintosh Databases.

José M. Sánchez García



Full Professor of Industrial Engineering and Artificial Intelligence.

Ph.D., in Industrial Engineering, University of Texas at Arlington, 1990.

Research interest areas:

Utilization of Artificial Intelligence Techniques for Developing Intelligent Manufacturing Systems.

Coordinated Projects:

Concurrent engineering. Design for manufacturing. Computer-aided process planning. Computer integrated manufacturing. CAD/CAM. Intelligent decision support systems. Expert system for acrylic fiber processing machine maintenance. Expert system for water treatment. Expert system for boiler operation control. Intelligent feature based approach for design for producibility. Intelligent process planning assistant for circuit board assembly.

Rogelio Soto Rodríguez



Associate Professor of Control and Electrical Engineering.

Ph.D., Electrical Engineering, University of Texas at Arlington, 1990.

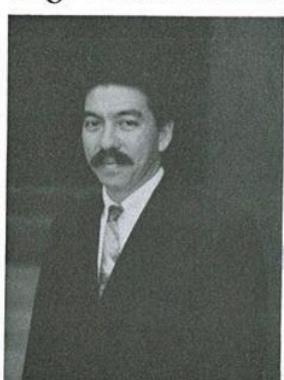
Research interest areas:

Nonlinear Systems Theory and Design of Nonlinear Controls, CAD for Control Systems, Neural Networks for Modeling and Control, Expert Control, Fuzzy Control and Knowledge Base Control Systems.

Coordinated projects:

Real-time expert system for direct reduction process - AI in control system. Expert system for continuous foundry control- AI in control system.

Hugo Terashima Marín



Assistant Professor of Computer Science and Artificial Intelligence.

M.Sc., Computer Science, University of Oklahoma, 1987.

Research interest areas:

Knowledge-based Systems (Acquisition and Representation), Parallelism and Algorithms, Scheduling Problems.

Coordinated projects:

Intelligent Scheduler for Crysel. Expert system in XEROX. Expert system for Human Resources Department in CYDSA.

Manuel Valenzuela Rendón



Associate Professor of Control Engineering.

Ph. D., Electrical Engineering, University of Alabama, 1989.

Research interest areas:

Optimization and Design by Means of Nature Inspired Methods Including Genetic Algorithms and Simulated Annealing, Intelligent Control Based on Learning Classifier Systems, Fuzzy Controllers, and Neural Networks.

Coordinated projects:

An intelligent system for steel roll annealing scheduling. Current research areas: Solving scheduling and other ordering problems using genetic algorithms. Deception in genetic algorithms and its relation to other blind search methods. Fuzzy logic and its applications in learning classifier systems.

Graduate and Undergraduate Courses Taught 1991

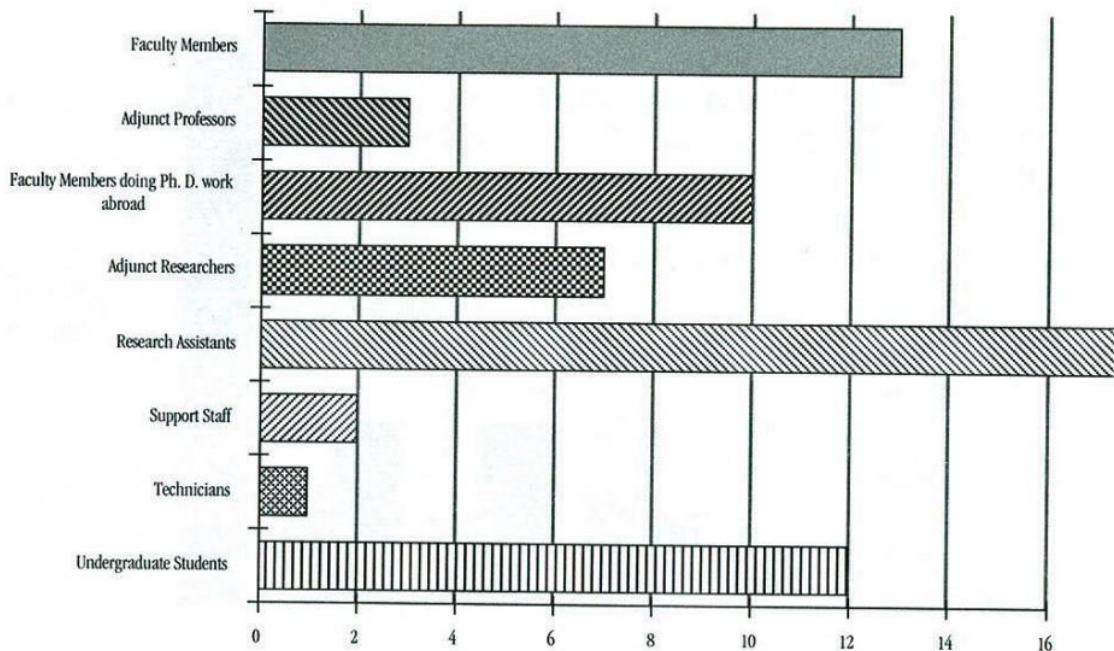
Graduate

- Analysis of Algorithms.
- Theory of Computation.
- Discrete Mathematics.
- Automated Reasoning.
- Artificial Intelligence.
- Advance Programming Languages.
- Genetic Algorithms.
- Petri Nets.
- Neural Nets.
- Knowledge Based Systems.
- Computer Integrated Manufacturing.
- Nonlinear Control.
- Systems Identification.

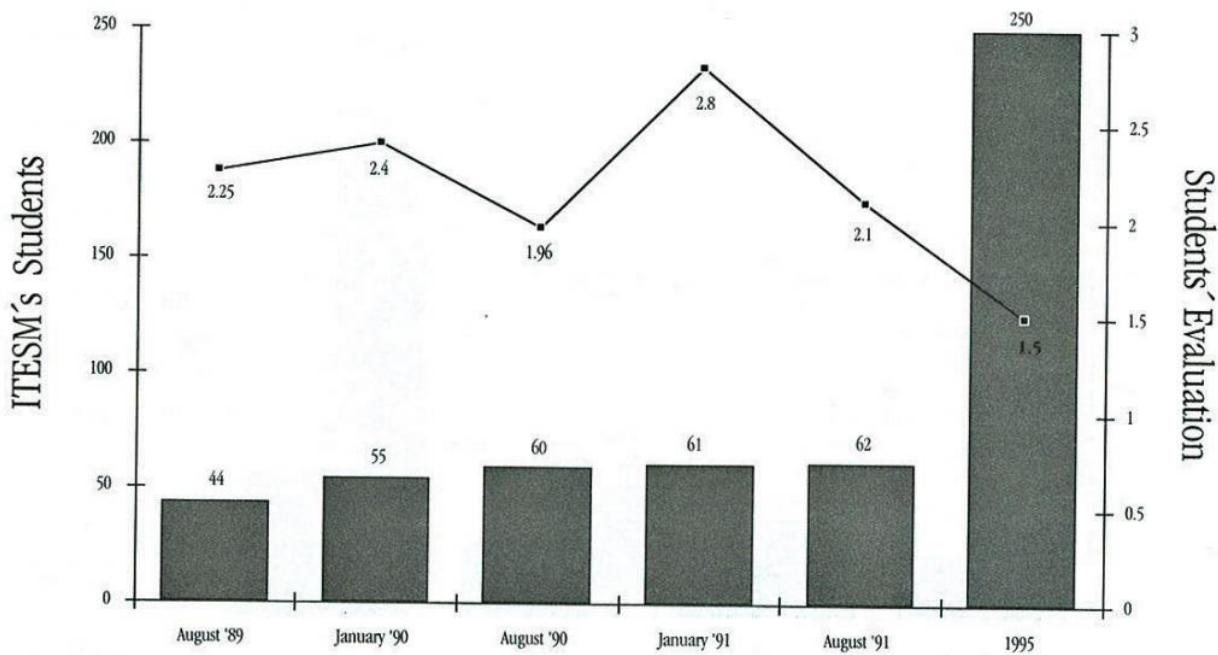
Undergraduate

- Analysis of Algorithms.
- Artificial Intelligence.
- Computer Programming.
- Development of Systems with Microprocessors.
- Information Systems Development and Management.
- Operations Research.
- Software Development Practice.

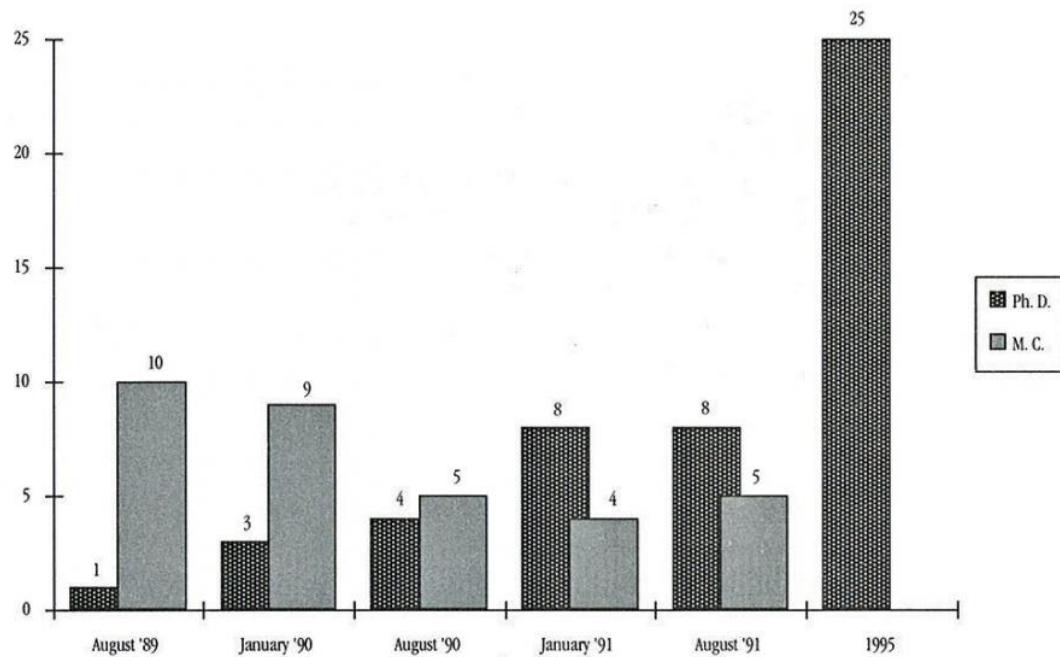
Human Resources 1991



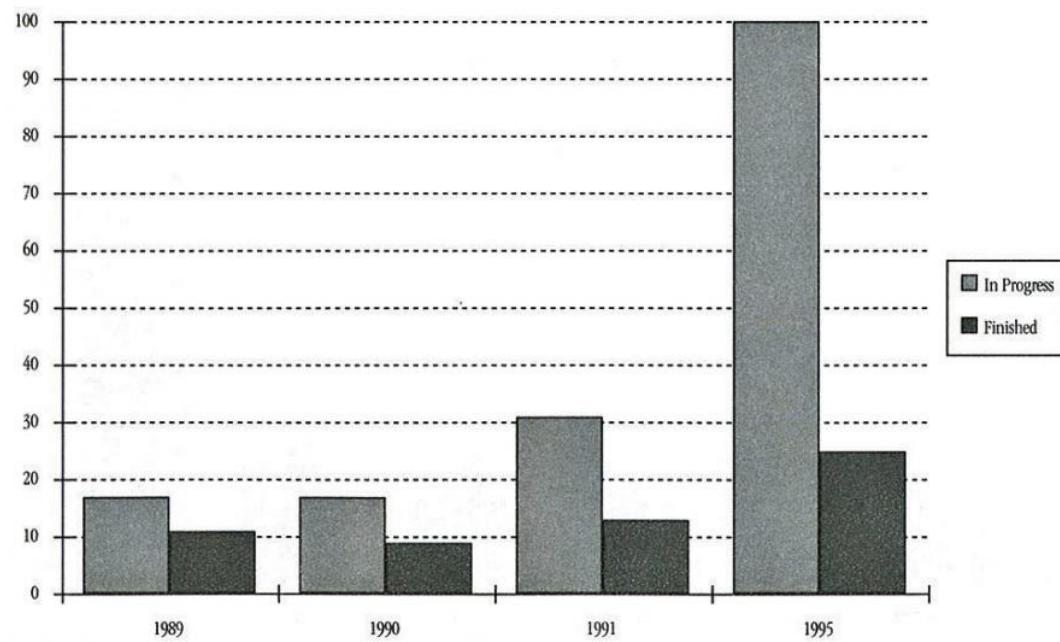
Teaching



Faculty Members



Theses



Faculty doing Ph. D. work abroad

Mario Aguilar. B.Sc., Computer Science, Jacksonville State University, 1989. Neural networks, cognitive systems. Currently attending Boston University.

Nora E. Aguirre. M.Sc., Information Systems, ITESM, 1986. Natural language, neural networks and expert systems. Currently attending Indiana University.

Ignacio Celis. M.Sc., Computer Science, Indiana University, 1989. Microprocessors, digital logic, data structures, object programming. Currently attending Indiana University.

José Luis Contreras. M.Sc., Electrical Engineering, University of Colorado at Boulder, 1989. Computer vision and digital image processing, neural networks. Currently attending Boston University.

Patricia Hinojosa. M.Sc., Informatics, Institut National Polytechnique de Grenoble, 1991. Parallel arquitectures. Currently attending University of Heidelberg.

Mario García. M.Sc., Computer Science, ITESM 1991, M.Sc. Control Engineering ITL, 1986. Real-time expert systems.

Rocío Guillén. M.Sc., Artificial Intelligence, Institut Technologique de Compiegne, France, 1984. Natural language, knowledge representation, expert system applications, and uncertainty management. Currently attending New Mexico State University.

Octavio Juárez. M.Sc., Computer Science, CINVESTAV 1990. Machine learning.

Horacio Martínez. M.Sc., Control Engineering, ITESM, 1986. Adaptive control, neural networks, speech recognition and robotics. Currently attending Iowa State University.

Eduardo Uresti. M.Sc., Mathematics, CINVESTAV, 1988. Automatic theorem proving, intelligent tutoring systems. Currently attending ITESM.

A djunct Faculty

Joaquín Acevedo. M.Sc., Chemical Engineering ITESM, 1990. Chemical Engineering Department. Expert systems in process systems, simulation.

Graciano Dieck. Ph.D., Electrical Engineering, University of Texas at Austin, 1983. Electrical Engineering Department. Process optimization, intelligent control, and microprocessors applications in artificial intelligence.

Carlos Pfiffer. M.Sc., Control Engineering, ITESM, 1990. Computer Science Department. Real-time expert systems, adaptive control, robotics.

V isiting professors

Faculty from associated universities.

Participate either as graduate course teachers, theses supervisors, project advisors, seminar instructors or lecturers:

Dr. Robert Cartwright, Full Professor, Computer Science Department, Rice University. Theory of programming languages, semantics of programming languages.

Dr. Robert Dale, Lecturer Artificial Intelligence Department and Center for Cognitive Science, University of Edinburgh, Scotland. Natural Language understanding, computational linguistics.

Dr. Newton Ellis, Full Professor, Industrial Engineering, Department Texas A&M University. Human factors, knowledge acquisition and engineering, expert/knowledge based systems.

Dr. Robert Fisher, Lecturer, Artificial Intelligence Department, University of Edinburgh, Scotland. Computer vision.

Dr. Randolph Goebel, Associate Professor, Computer Science Department, University of Alberta. Mathematical logic, automated reasoning, semantics of programming language.

Dr. David Goldberg, Associate Professor, Mechanical Engineering, University of Illinois. Genetic algorithms.

Dr. Christopher Haynes, Associate Professor, Computer Science, Indiana University. Functional programming.

Dr. Robert Hood, Associate Professor, Computer Science, Rice University. Algorithms.

Dr. S. Lakhsivarahan, Full Professor, University of Oklahoma. Parallel architectures, scientific computing, automated reasoning.

Dr. Jean Claude Latombe, Associate Professor, Robotics Laboratory, Stanford University. Robotics, computational geometry.

Dr. Lori Levin, Associate Professor, Center for Machine Translation, Carnegie Mellon University.

Dr. Jay Liebowitz, Full Professor, Management Science Department, The George Washington University. Knowledge based and expert systems.

Dr. Gordon Novak, Associate Professor, Computer Science, University of Texas at Austin. Artificial intelligence.

Dr. Dick Simmons, Full Professor, Computer Science Department, Texas A&M University. Artificial intelligence, software engineering, computer architecture, expert systems.

Dr. Masaru Tomita, Associate Professor, Center for Machine Translation, Carnegie Mellon University.

A ssociated Universities

CARNEGIE MELLON UNIVERSITY
Robotics Institute

RICE UNIVERSITY
Computer Science Department

STANFORD UNIVERSITY
Robotics Laboratory

TEXAS A&M UNIVERSITY
Cognitive Systems Laboratory

UNIVERSITY OF ALBERTA
Computer Science Department

UNIVERSITY OF EDINBURGH
Artificial Intelligence Department

UNIVERSITY OF OKLAHOMA
Computer Science Department

UNIVERSITY OF TEXAS AT AUSTIN
Artificial Intelligence Laboratory

Graduate program in AI

1991

Master of Science in Computer Systems:

Artificial Intelligence.

- Theory.
 - Discrete Mathematics.
 - Analysis of Algorithms.
 - Theory of Computation.
- Systems.
 - Artificial Intelligence.
 - Knowledge Based Systems.
 - Automated Reasoning.
- Applications.
 - Integration of Knowledge Based Systems.
 - Neural Nets.
 - Pattern Recognition.
 - Genetic Algorithms.
 - Machine Learning.
- Seminars.
 - Thesis Seminar.
 - Thesis I.
 - Thesis II.
 - Personal Development I.
 - Personal Development II.

Ph. D. in Informatics.

- 1st. Year.
 - Breadth Courses.
 - Comprehensive Exams.
- 2nd. Year.
 - In Depth Courses.
 - Qualifiers.
 - Dissertation Proposal.
- 3rd. Year.
 - Dissertation.
- 4rd. Year.
 - Dissertation.
- AI Specializations.
 - Knowledge Based Systems.
 - Cognitive Systems.
 - Intelligent Robotics.
 - Distributed Artificial Intelligence.
 - Intelligent Decision Support Systems.

R

esearch

1991

Research projects being developed are:

- Knowledge-based Systems Development Based on High Level Knowledge Models. *José Luis Aguirre, Ramón Brena.*
- Anticipation Theory Applied to Process Optimization and Intelligent Control Systems. *Graciano Dieck.*
- Computer Vision for Automated Manufacturing. *José Luis Gordillo.*
- Intelligent Control Systems: A Case Study in Electrical Drive System. *Rogelio Soto.*
- Product Development Methodology for Concurrent Engineering Environments. *José Manuel Sánchez.*
- Task Programming and Execution Control of Manufacturing Systems. *Ernesto López.*
- Plan Generation for Inductive Proof in Program Verification. *Francisco J. Cantú.*
- Solving Ordering Problems using Genetic Algorithms. *Manuel Valenzuela.*
- Process Automatic Control using Genetic Algorithms. *Manuel Valenzuela.*

The following classes of problems are being investigated:

- Diagnosis and Repair.
- Monitoring and Control.
- Design (Planning and Scheduling).

Work is being done in the following problem domains:

- Manufacturing: production, maintenance, process control.
- Human Resources: assessment and matching of candidates and job positions profiles.
- Sales: technical support for salesmen and clients.
- Finance: banking, underwriting, stock trading.
- Medicine.

Types of industries for which projects are being developed include:

- | | |
|------------------------------------|-----------------------------------|
| <input type="checkbox"/> Steel. | <input type="checkbox"/> Plastic. |
| <input type="checkbox"/> Textile. | <input type="checkbox"/> Bank. |
| <input type="checkbox"/> Chemical. | <input type="checkbox"/> Brewery. |

The following interest groups are being established among ITESM Monterrey Campus faculty:

- | | |
|--|--|
| <input type="checkbox"/> AI in Control Engineering. | <input type="checkbox"/> AI in Industrial Engineering. |
| <input type="checkbox"/> AI in Chemical Engineering. | <input type="checkbox"/> AI in Finance. |
| <input type="checkbox"/> AI in Electrical Engineering. | <input type="checkbox"/> AI in Medicine. |
| <input type="checkbox"/> AI in Civil Engineering. | <input type="checkbox"/> AI in Manufacturing. |
| <input type="checkbox"/> AI in Mechanical Engineering. | <input type="checkbox"/> AI in Quality Control. |

Development 1991

CIA has mid-term agreements for research and development in expert systems with a variety of firms. The following are among the most important during 1991:

CYDSA Group.

Research and development of expert systems in manufacturing for textile and chemical plants.

- Boiler operation control.
- Maintenance of acrylic fiber processing machines.
- Color control in rayon fiber.
- Diagnosing color problems in acrylic fiber.
- Maintenance of tooth paste tube machines.
- Real-time reactor control.
- Production programming.
- Coagulation machine control in a cellophane plant.
- Interpretation of psychometric tests.
- Industrial-use water analysis.
- Cellophane film cutting and finishing.

HYLSA.

Research and development in AI applications for the steel industry.

- Intelligent system for programming steel lingot reheating.
- Intelligent system for programming steel roll annealing.
- Real-time expert system for direct reduction process.
- Expert system for continuous foundry control.

PYOSA.

Research and development in applications for chemical processes.

- Design of chemical formulation for making colorants.
- Technical support in sales.

E xtension 1991

DIPLOMA IN EXPERT SYSTEMS
Monterrey Campus

DIPLOMA IN EXPERT SYSTEMS
Edo. de Mexico Campus

CERTIFICATE PROGRAM
IN KNOWLEDGE
ENGINEERING

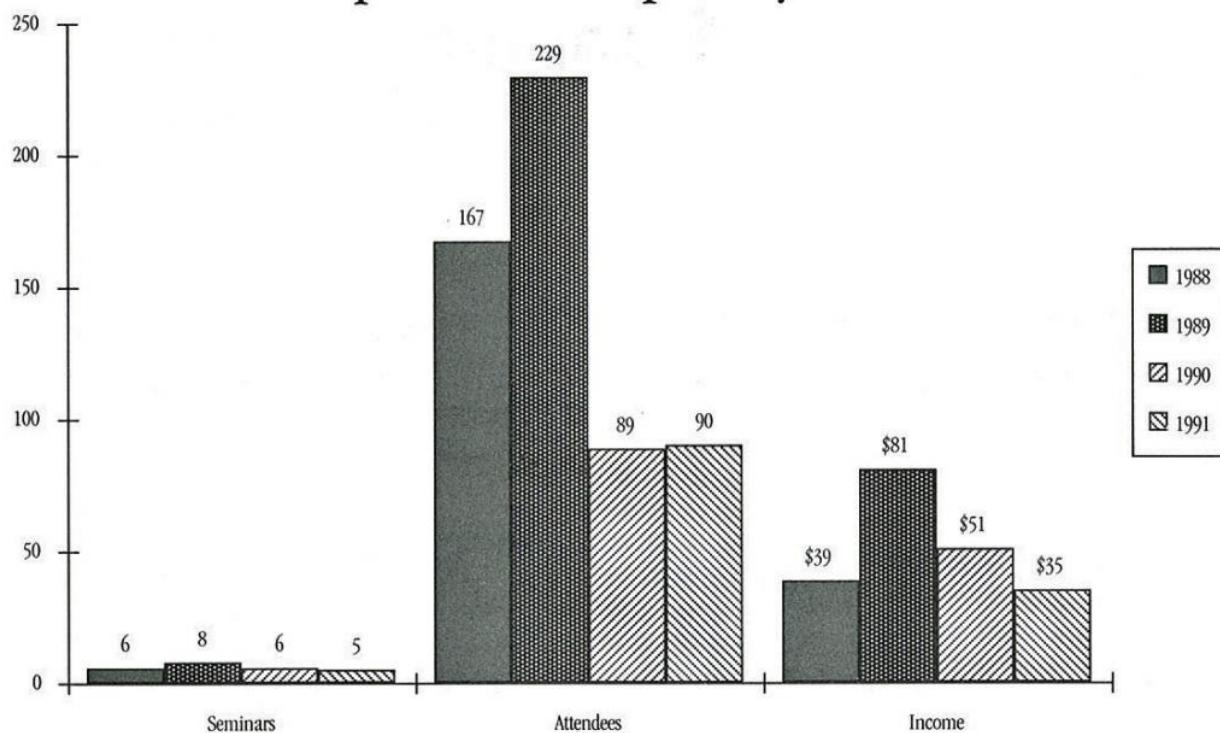
4 TH. INTERNATIONAL
SYMPOSIUM ON ARTIFICIAL
INTELLIGENCE

LECTURE SERIES IN E.S. AND A.I.
FOR HIGH-LEVEL MANAGEMENT

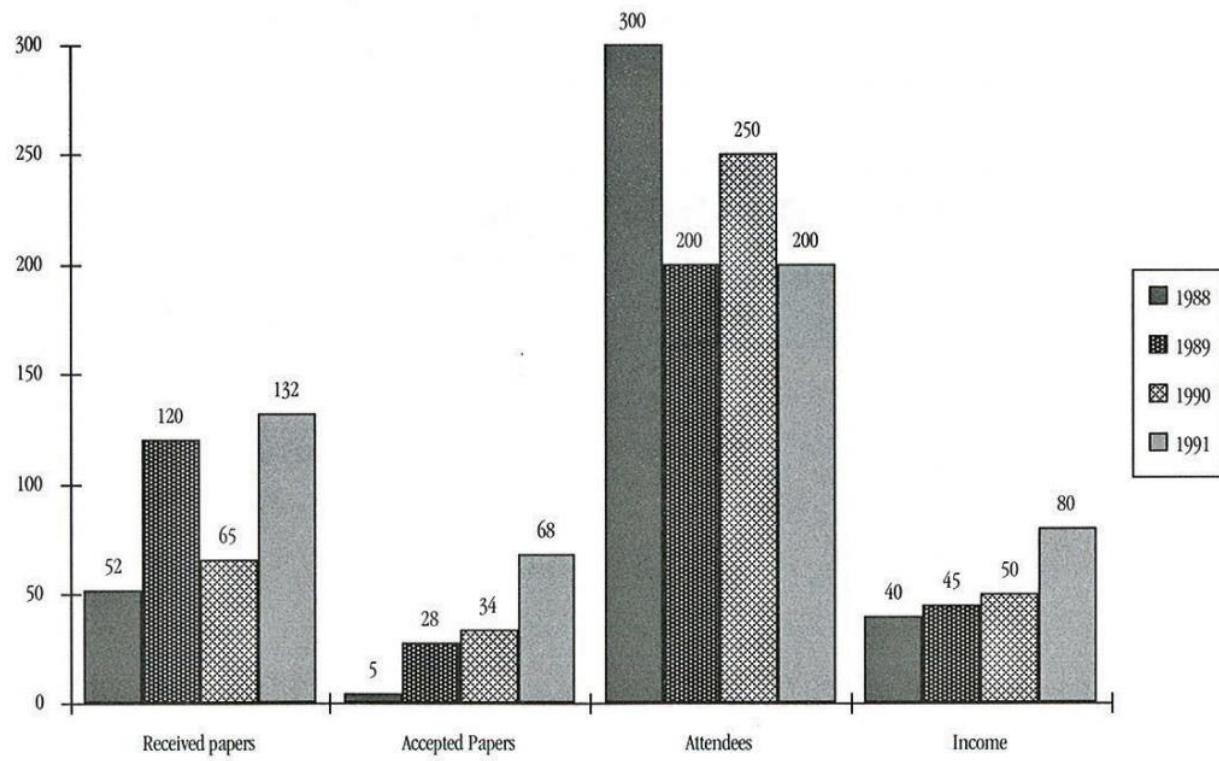
SPECIAL PRESENTATIONS ON
THE USE OF A.I. AND E.S.

TRAINING OF KNOWLEDGE
E N G I N E E R S

Diploma in Expert Systems



International Symposia on Artificial Intelligence



R_elations 1991

American Association for Artificial Intelligence

Association for Computing Machinery

Canadian Society for Computational Studies of Intelligence

European Coordinating Committee for Artificial Intelligence

Institute of Electrical and Electronics Engineers Inc.

International Association of Knowledge Engineers

International Joint Conferences on Artificial Intelligence Inc.

Sociedad Mexicana de Inteligencia Artificial

Graduate students

Ph. D. and M. Sc. Degrees Conferred

During the 91 academic year, 1 Doctoral degree and 12 Master of Science degrees were conferred to the following Computer Sciences students. Their dissertation title, graduation date, and supervising professor are included.

Gilberto Alapizco, "Propositional Calculus Intelligent Tutor". M. Sc. Thesis (ITESM). Fall, 1991. Supervising professor: Eduardo Uresti.

Jorge Avendaño, "Design and Implementation of a Task Scheduling System in Manufacturing Flexible Cells". M. Sc. Thesis (ITESM). Fall, 1991. Supervising professor: José Luis Gordillo.

Elvia Patricia Barrón, "First Approach in Solving the Problem of Grouping Words in Spanish by Lexical Analysis for a Speech Recognition System". M. Sc. Thesis (ITESM). Summer, 1991. Supervising professor: Manuel Valenzuela.

Eric Bautista, "Using a Genetic Algorithm to Solve the Two-Machines Job Scheduling Problem". M. Sc. Thesis (ITESM). Fall, 1991. Supervising professor: Manuel Valenzuela.

Santiago Enrique Conant, "Development of a Knowledge Engineering Tool which generates an Expert Systems with a Friendly User Interface". M. Sc. Thesis (ITESM). Fall, 1991. Supervising professor: Rocio Guillén.

Héctor de Luna, "Application of Blackboard Architectures for Production Processes". M. Sc. Thesis (ITESM). Summer, 1991. Supervising professor: Rocio Guillén.

Mario García, "Real Time Expert Systems". M. Sc. Thesis (ITESM). Summer, 1991. Supervising professor: José Luis Gordillo.

Arturo González, "Genetic Algorithms: An Application to the Design of Digital Filters". M. Sc. Thesis (ITESM). Fall 1991. Supervising professor: Manuel Valenzuela.

José Manuel Mora, "A Model of Qualitative Reasoning Applied to Financial Domain". M. Sc. Thesis (ITESM). Summer, 1991. Supervising professor: Francisco J. Cantú.

Iván Ordoñez, "Solving the Generalized Traveling Salesman Problem by Means of Genetic Algorithms and Special Crossover Operators". M. Sc. Thesis (ITESM). Fall, 1991. Supervising professor: Manuel Valenzuela.

Antonio Eloín Rodríguez, "A Generation and Evaluation of Essay Data System for Constructive Specifications". M. Sc. Thesis (ITESM). Fall, 1991. Supervising professor: Robert Cartwright.

José Luis Romero, "System Identification by Means of Genetic Algorithms". M. Sc. Thesis (ITESM). Fall, 1991. Supervising professor: Manuel Valenzuela.

Ph. D. and M. Sc. Candidates

The following students are M. Sc. candidates. Their dissertation title, and supervising professor are included.

Jesús Alanís, "Activity Programming of Discrete Event Systems Using Petri Nets and Knowledge Based Systems". Supervising professor: Ernesto López.

Carlos Hernández, "Sliding Mode Control of Electrical

Drives (DC Drives)". Supervising professor: Rogelio Soto.

Jorge Alvarez, "Theory Development for Optimal Non Linear Sliding Mode Control". Supervising professor: Rogelio Soto.

Gerardo Mejía, "Neural Networks and the Identification Problem". Supervising professor: Rogelio Soto.

Carlos Cantú, "Solution to Non-Linear Set of Equations Applying Genetic Algorithms". Supervising professor: Manuel Valenzuela.

Mauricio Meléndez, "Artificial Intelligence Applied to Control Systems". Supervising professor: Rogelio Soto.

Luis Navarro, "Non Linear Control of a Robot Manipulator". Supervising professor: Rogelio Soto.

Mary Fonseca, "Local Network Planning, Analysis and Design". Supervising professor: Pablo Ramírez.

Eduardo Olivares, "Intermediate Knowledge Representation Models: An Application to Design Problems". Supervising professor: José Luis Aguirre.

Alfonso Galindo, "Voice Signals Compression Using Neural Nets". Supervising professor: Manuel Valenzuela.

Luis Palomino, "Modeling of a Flexible Manufacturing Systems Using Petri Nets". Supervising professor: José Manuel Sánchez.

Eduardo Gamero, "Sliding Mode Control of Electrical Drives (AC Drives)". Supervising professor: Rogelio Soto.

Guillermo Sandoval, "Kalman Filtering Applied to Identification of Turn Variant Plants". Supervising professor: Rogelio Soto.

Nelly García, "Intermediate Knowledge Representation Models: An Application to Diagnosis Problems". Supervising professor: José Luis Aguirre.

Sergio Vallejo, "A Controller Programming System for Manufacturing Cells". Supervising professor: Ernesto López.

José Garza, "Automatic Diagnosis Valuation of Cranio-Facial Malformations". Supervising professor: José Luis Gordillo.

Juan Antonio Vega, "Analysis and Design of Neural Nets Using Genetic Algorithms". Supervising professor: Manuel Valenzuela.

Ciro González, "Integrating Expert Systems and Object Oriented Databases in a Concurrent Engineering Environment". Supervising professor: José Manuel Sánchez.

Guillermo Handal, "Automatic Control Using Neural Nets Trained by a Genetic Algorithm". Supervising professor: Manuel Valenzuela.

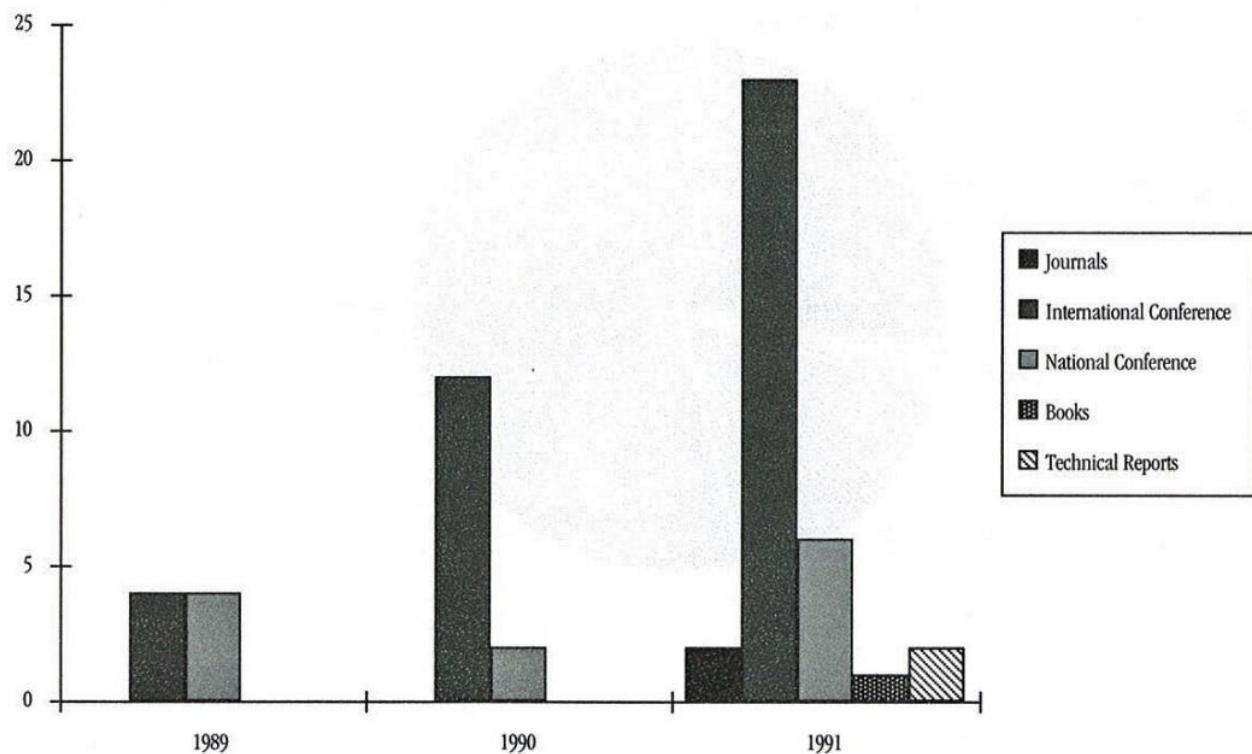
P

ublications

1991

- Aguirre J.L., "CELLOS : An Expert System for Diagnosing Quality Defects on Cellophane Film Production", Proceedings of The World Congress on Expert Systems. Orlando, Florida, 1991.
- Aguirre J. L., "Mechanisms for Technical Diagnosis in Object Knowledge Models", Iberamia '92, La Habana, Cuba, 1992
- Arjona, E., López, E., "Automatic Synthesis of Coloured Petri nets for Real-Time Simulation of Discrete Event Systems", Int. Simulation Technology Conference. Orlando, Fla. USA, 1991
- Bautista Vera, E., & Valenzuela-Rendón, M. "Optimization of Permutations by means of Genetic Algorithms: Scheduling Problems", Proceedings of the III Congreso Iberoamericano de Inteligencia Artificial (pp. 217-230), 1992.
- Cantu-Ortiz, F. (ed.), "Operational Expert Systems in Mexico", Pergamon Press, New York, 1992.
- Cantu-Ortiz, F., "An Overview of Expert Systems in Mexico", Operational Expert Systems in Mexico, (F. Cantu-Ortiz, ed.) Pergamon Press, New York, 1992.
- Cantu-Ortiz, F., "Expert Systems in Manufacturing: An experience in Mexico", Expert Systems with Applications: An International Journal (J. Liebowitz, ed.), 3(4) Pergamon Press, New York, 1991.
- Cantu-Ortiz, F., García, M., "An Expert System for Diagnosing Problems in Boiler Operation", Proceedings of the World Congress on Expert Systems (J. Liebowitz, ed.), Pergamon Press, New York, 1991.
- Cantu-Ortiz, F., "Human Resources Formation in Knowledge Engineering: Experiences in Staffing Expert Systems Development Teams", Heuristics: The Journal of Knowledge Engineering, 4(2) pp 32-42, Special Avignon '91 Edition, Systemsware Corporation, Rockville MD, 1991.
- Gordillo, J.L., "L_E: A High Level Language for Specifying Vision Verification Tasks", IEEE International Conference on Robotics and Automation. Sacramento, CA, 1991.
- Gordillo, J.L., Lux, A., "Planning Visual Verification Request for Robot Tasks", Chapter in book "Avances de la Robótica y la Visión", (James Crowley, ed.), 1991.
- Gordillo, J.L., Elizalde, H., "Automatic Colored Fuse Recognition and Assembly", Transferencia, ITESM, 1991.
- Gordillo, J.L., Sossa, J.H., Wiederhold, P., "An Introduction to Image Analysis and Pattern Recognition", CINVESTAV-IE Technical Reports, 1991.
- Guerra-Salcedo, C.M., & Valenzuela-Rendón, M. "Soving Partial Match Queries by means of Genetic Algorithms", Proceeding of the VIII National Conference on Artificial Intelligence (pp13-28). México. Sociedad Mexicana de Inteligencia Artificial, 1991.
- Ordoñez Reinoso, G., & Valenzuela-Rendón, M., "Optimization of Permutations by means of Genetic Algorithms: Traveling Salesman Problems", Proceedings of the III Congreso Iberoamericano de Inteligencia Artificial (pp. 217-230), 1992.
- Pfeiffer, C., Soto, R., García, M., and de León, A., "Expert System for On-Line Fault Diagnosis at Hojalata y Lámina, S.A.", IFAC International Symposium On Line Fault Detection and Supervision in the Chemical Process Industries, University of Delaware, Newark , Delaware, USA, 1992.
- Priest, J. W., Sánchez, José M. , and Pare, K., "Process Planning for Electronic Components", Invited Manuscript for inclusion in a Wiley Reference Book on Intelligent Design and Manufacturing, Editor-in-Chief: Professor Andrew Kusiak, Department of Industrial Engineering and Management, The University of Iowa, 1991.

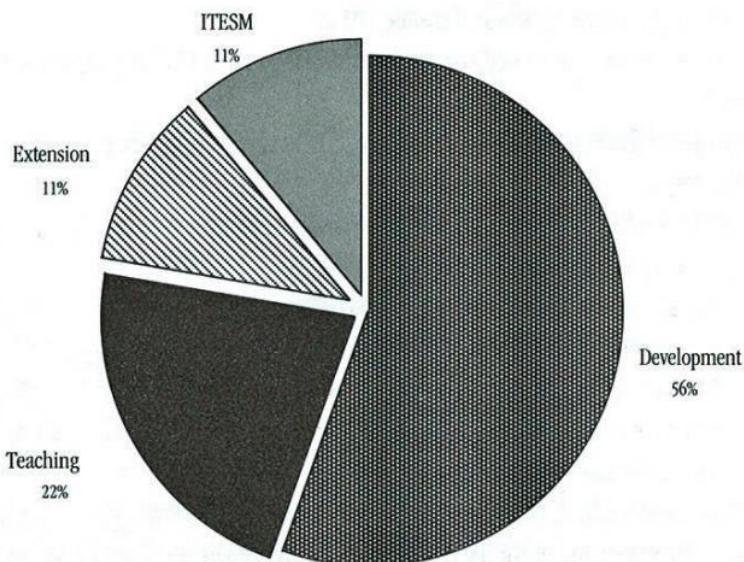
- Sánchez, J. M., John W. Priest and Pruchya Piumsomboon, "An Intelligent Feature Based Approach for Design for Producibility", Manufacturing International Conference, ASME, Dallas Texas, 1992
- Sánchez, J. M. and Pruchya Piumsomboon, "Producibility Measurements", Invited Manuscript for inclusion in the Design for Manufacturability, Volume 6 of the SME Tool and Manufacturing Engineers Handbook series, Editor-in-Chief: Mr. Ramon Bakerjian, Society of Manufacturing Engineers, Dearborn, Michigan, 1991.
- Soto, R., and Yeung, Kai. S., "Sliding-mode Control of an Induction Motor Without Flux Measurement", IEEE Industrial Application Society 27th. Annual Meeting and Conference, 1992.
- Soto, R., and Yeung, Kai. S., "Robust Control of an Induction Motor", IEEE Transactions on Industrial Electronics (Submitted for publication).
- Soto, R., Flores, J., "Computer Aided Control System Design", I Congress of the Iberoamerican Academy of Computer Education, Santiago, Chile, 1991.
- Terashima, H., "SEHUSI an Expert System for Describing Human Behavior in a Work Environment", Chapter in book "Operational Expert Systems in México", Pergamon Press, 1991.
- Valenzuela-Rendón, M., "The fuzzy classifier system: Motivation and first results", In H. P. Schwefel & R. Männer (Eds.), Parallel problem solving from nature (pp. 330-334). Berlin: Springer (Verlag), 1991.
- Valenzuela-Rendón, M., "The fuzzy classifier system—A classifier system for continuously varying variables", In R. K. Belew y L. B. Booker (Eds.) Proceedings of the Fourth International Conference on Genetic Algorithms (pp. 346-353). San Mateo, CA: Morgan Kaufmann, 1991.
- Valenzuela-Rendón, M., Guerra-Salcedo, C. M., & Icaza, J. I. "A Genetic Algorithm Approach to Partial Match Retrieval Based on Hash Functions", Proceedings of the IV International Symposium on Artificial Intelligence (pp. 156-162). México. Limusa, 1991.



Finance 1991

Income

\$900,000 USD



Costs

\$900,000 USD

